

Packaging and Reliability of Electronic Noses for Space Applications

Rajeshuni Ramesham
Jet Propulsion laboratory
California Institute of Technology
4800 Oak Grove Drive, Pasadena, CA 91109

Successful development of an electronic nose requires a development of an array of sensors that are specific to the compounds of interest. The sensing medium in the e-nose developed at JPL is insulating polymer films made conductive by dispersion of carbon particles in the film. These films respond to a change in air composition with a change in resistance. The resistance change in the array is characteristic of the compound causing it. Electrical, mechanical and thermal test methods will be used to characterize key reliability properties of these sensing media. Environmental characterization as well as establishment electrical behavior will be used to define electrical threshold and/or change in baseline resistance as early failure detection tool and bound critical process parameters such as temperature, humidity, pressure, aging of sensors, and sensors saturation. Our main objective is to assess the reliability of packaged JPL developed and commercially available electronic noses to determine their utility as an air quality monitor in crew habitat on a spacecraft, International Space Station, etc. This paper reviews the current status of e-nose packaging technology from COTS to specific application, provides lessons learned, and finally, identifies a need for a systematic approach for this purpose.